

**II. AMENDMENTS TO THE CLAIMS:**

Please cancel claims 29, 32, 34, 35, 39, 42 and 44 without prejudice. Kindly amend claims 26-28, 30, 31, 33, 36-38, 40, 41, 43 and 45-50 as follows.

The following Listing of Claims replaces all prior versions and listings of claims in the above-captioned application.

**LISTING OF CLAIMS:**

Claims 1-25 have been canceled.

26. (Currently Amended) An information processing system comprising:

(a) a plurality of plural information processing units arranged in a ring shape, each unit holding a local information block to represent~~express~~ tabular data expressed as an array of records including an item values belonging to respective items~~and item values belonging to the item~~; and

(b) a packet transmission path to connect the plurality of plural information processing units,

wherein the local information block includes a value list having~~in~~ which the item values ~~are~~ stored in order of item value numbers indicating positions of the~~corresponding to~~ item values in the value list~~belonging to a specific item~~, and a pointer array in which pointer values ~~to~~ indicate the item value numbers ~~are~~ stored in order of unique local sequence numbers ~~to indicate a unique local order~~ corresponding to the records, wherein~~and the~~ information processing unit is characterized in that

each of the information processing units includes:

i. means for creating, based on the local sequence numbers ~~to indicate the local order~~ in the local information block, unique global sequence numbers ~~to indicate a unique global order~~ in all of the plurality of plural information processing units;

ii. means for transmitting the value list to one adjacent first another information processing unit through the packet transmission path;

iii. means for receiving the value list from an other second adjacent the another information processing unit through the packet transmission path; and

iv. means for giving a global sequence number across all of the plurality of information processing units to the item value in the value list in the local information block, wherein a duplicate item value in the item values in the value list from the other second information processing unit is deleted when there is a duplicate value between the value lists transmitted to the first information processing unit and received from the other second information processing unit giving, by referring to an item value in the value list from the another information processing unit, a global order in all the plural information processing units to the item value in the value list in the local information block.

27. (Currently Amended) An information processing system comprising:

(a) a plurality of plural memory modules arranged in a ring shape, each having a memory, an interface, and a control device; and

(b) a packet transmission path connecting interfaces of the adjacent memory modules, wherein a memory of each of the memory modules holds an information block for each item in order to represent tabular data expressed as an array of records including item values belonging to respective items so that the information block includes including a value list having the item values stored in order of item value numbers indicating positions of the item values in the value list and also includes a pointer array having pointer values that indicate the item value numbers stored in order of unique local sequence numbers corresponding to the records, and that an aggregate of information blocks held by respective memories forms a global information block, wherein which is for expressing tabular data

~~expressed as an array of records each including an item and an item value belonging to the item and in which item values are stored in order of item value numbers corresponding to the item values belonging to a specific item, and a pointer array in which pointer values to indicate the item value numbers are stored in a unique order of an ordered set array, and a global information block is formed of an aggregate of the information blocks held in the respective memories, and the information processing system is characterized in that~~

the control device of each of the memory modules includes:

    i. offset value storage means for holding an offset value to indicate which position the that its own grasped information block held by this memory module occupies in the global information block, as a subset of the global information block, occupies which position in the pointer array;

    ii. global ordered set array creation means for creating, based on the offset value, a global ordered set array containing global sequence numbers corresponding to the records in the global information block;

    iii. packet transmission means for packetizing the packeting its own value list for each of an item held by this memory module and transmitting the value list to one adjacent second memory module it by using the transmission path between the adjacent memory modules;

    iv. packet reception means for receiving packetized a packeted value lists held by other third memory modules from an other adjacent fourth list of another memory module by using the transmission path in parallel to packet transmission by the packet transmission means; and

    v. order judgment means for determining a global sequence number of the item value in the value list held by this memory module across the global information block based on a relative sequence number of the item value in the value list held by this memory

module and for storing the global sequence number of the item value in the value list held by this memory module into a global value number array for each item, wherein the value list held by this memory module is compared with each of the received value lists, a duplicative value from each of the received value lists is deleted when there is a duplicative value between the value list held by this memory module and each of the received value lists, and the relative sequence number is determined in relation to the received value lists determining an order, in the global information block, of the item value in its own value list of the item by referring to the received respective value list and for storing the order, in the global information block, of the item value into a global value number array relating to the item.

28. (Currently Amended) The information processing system according to claim 27, wherein the information processing system further comprises record extraction means for specifying a value in the global ordered set array in accordance with an instruction to specify a sequence number of the record and extracting the record indicated by the specified value characterized in that the order judgment means is constructed to calculate the order in the global information block by adding a total sum of differences between the judged respective relative orders and the original order to the original order.

29. (Cancelled)

30. (Currently Amended) The information processing system according to claim 27, wherein characterized in that the control device of each of the memory modules further includes:

flag array setup means for creating, with respect to an item to be retrieved, a flag array with a same size as the value list for an item to be retrieved of the item and for setting giving a

specific value to an element at a position corresponding inside of the flag array corresponding to an item value satisfying coincident with a retrieval condition;

retrieval condition judgment means for judging, for the item to be retrieved, whether a record corresponding to a value in the ordered set array satisfiesis coincident with the retrieval condition by specifying, with respect to the item to be retrieved, a value in the pointer array corresponding to a position indicated by the value in the ordered set array and then by specifying a value in the flag array corresponding to a position indicated by the value in the pointer array; and

local retrieval means for storing thea value in theof an ordered set array satisfying coincident with the retrieval condition and a corresponding value in theof a corresponding global ordered set array into a second ordered set array and a second global ordered set array, respectively,

wherein the packet transmission means packetizes and transmitsuses the transmission path, packets the second global ordered set array to the one adjacent second memory module using the transmission pathand transmits it, the packet reception means uses the transmission path and receives the packetizeda packetized second global ordered set arrays from the other adjacent fourtharray of another memory module,

the control device of each of the memory modules further includes there is further included second order judgment means for determining sequence numberan order, in the global information block, of thea value in the secondits own global ordered set array held by this memory module across the global information block by referring to the received respective second global ordered set arraysarray and for storing the determined sequence number acrossorder in the global information block into a third global ordered set array, and a sequence numberan order of a record satisfying coincident with the retrieval condition is decided by thea value of the third global ordered set array.

31. (Currently Amended) The information processing system according to claim 27,  
wherein characterized in that the control device of each of the memory modules further  
includes

~~count-up means for creating, with respect to items to be tabulated, a logical coordinate array with a size obtained by multiplying sizes of value lists of the items and for acquiring the number of records for each set of item values of each item by counting up values in a of the logical coordinate array having a size equal to a product of sizes of value lists for items to be tabulated by the number of records held by this memory module for each of sets of item values for the items to be tabulated, wherein the values in the logical coordinate array indicate the number of indicated by values in the ordered set array and corresponding to the sets of global sequence numbers of the item values across the global information block the values in the pointer arrays of the items to be tabulated,~~

wherein the packet transmission means packetizes the transmission path, and packages and transmits the logical coordinate array, to in which count-up has been applied performed by the count-up means, to one adjacent fifth memory module through the transmission path,

wherein the packet reception means receives the counted up logical coordinate array from the other adjacent fourth memory module through the transmission path, and global numbers of the records for each set of the item values for the respective items are stored in the logical coordinate array by repeating the reception, count-up and transmission of the logical coordinate array among the control devices of the respective memory modules~~the number of records for each set of item values of each global item is stored in the logical coordinate array by sequentially executing, in each of the memory~~

~~modules, the count up of the same logical coordinate array and the transmission using the transmission path, and~~

~~in each of the memory modules, the packet reception means and the packet transmission means sequentially execute reception and storage of the logical coordinate array in which the count up has been ended, and the transmission using the transmission path.~~

32. (Cancelled)

33. (Currently Amended) The information processing system according to claim 27, wherein characterized in that the control device of each of the memory modules further includes:

existence number array creation means for creating, with respect to an item to be sorted, an existence number array with the same size as that of a value list for an item to be sorted of the item and for arranging numbers the number of values in the existence number array, the values into specify respective item values in the value list, of the ordered set array specifying respective item values in the value list;

accumulated number array creation means for accumulating the values in the existence number array, calculating an accumulated numbers number to indicate a-head positions position of records a record having a corresponding item values value at a time when the sort is performed in this the memory module, and arranging the accumulated numbers number in an accumulated number array; and

local sort means for creating a second global value number array, a fourth global ordered set array and a third ordered set array, and arranging a global value number corresponding to the item value in the second global value number array, the at a position indicated by the accumulated number in the second global value number array based on the

accumulated number in the accumulated number array corresponding to an item value indicated by a value of the ordered set array, and arranging a value of the ordered set array in the third ordered set array and the a value of the corresponding global ordered set array in the fourth global ordered set array at respective positions a position indicated by the accumulated number based on the accumulated number in the accumulated number array corresponding to the item value indicated by the value of the ordered set array in the third ordered set array and the fourth global ordered set array,

wherein the packet transmission means packetizes uses the transmission path, and packets and transmits at least the second global value number array to the one adjacent second memory module through the transmission path, while and the packet reception means uses the transmission path in parallel and receives a packetized packet second global value array from the other fourth adjacent of another memory module through the transmission path in parallel to the second global value number array being transmitted to the one adjacent second memory module, and

the control device of each of the memory modules further includes there is further included third order judgment means for storing a sequence number an order, in the global information block, of a value in the its own second global value number array held by this memory module into at the fifth global ordered set array by referencing to the received second global value number arrays, wherein the sequence number of the value is determined in the global information block, and

a sequence number an order of the sorted record is defined decided by the value contained in of the fifth global ordered set array.

34. (Cancelled)

35. (Cancelled)

36. (Currently Amended) An information processing method for use in an information processing system including

(a) a plurality of plural information processing units arranged in a ring shape and distributing and making available data to the plurality of the information processing units, each unit holding a local information block to represent~~express~~ tabular data expressed as an array of records including an item and item values belonging to respective items~~the item~~, and  
(b) a packet transmission path to connect the plurality of plural information processing units,

wherein the local information block includes a value list having in which the item values ~~are~~ stored in order of item value numbers indicating positions of the corresponding to item values in the value list~~belonging to a specific item~~, and a pointer array in which pointer values to indicate the item value numbers are stored in order of unique local sequence numbers ~~to indicate a unique local order~~ corresponding to the records, wherein, in each of the information processing units, the method comprises the steps of: and  
— in each of the information processing units, the information processing method is characterized by comprising:

i. a step of creating, based on the local sequence numbers to indicate the local order in the local information block, unique global sequence numbers to indicate a unique global order in all of the plurality of plural information processing units;

ii. transmitting a step at which each of the information processing unit transmits the value list to one adjacent first~~another~~ information processing unit through the packet transmission path;

iii. receiving the a step at which each of the information processing unit receives a value list from an other second the another information processing unit through the packet transmission path; and

iv. deleting a duplicate item value in the a step at which each of the information processing units gives, by referring to an item values value in the value list from the other second another information processing unit when there is a duplicate value between the value lists transmitted from this processing unit and received from the other second processing unit, and giving a global sequence number across order in all of the plurality of the plural information processing units to the item value in the value list in the local information block.

37. (Currently Amended) An information processing method for use in an information processing system including

(a) a plurality of plural memory modules arranged in a ring shape and distributing and making available data to the plurality of information processing units, each unit having a memory, an interface, and a control device, and

(b) a packet transmission path connecting interfaces of the adjacent memory modules, wherein a memory of each of the memory modules holds an information block for each item in order to represent tabular data expressed as an array of records including item values belonging to respective items so that the information block includes a value list having the item values stored in order of item value numbers indicating positions of the item values in the value list and also includes a pointer array having pointer values that indicate the item value numbers stored in order of unique local sequence numbers corresponding to the records, and that an aggregate of information blocks held by respective memories forms a global information block, wherein in each of the information processing units, the method comprises the steps of including a value list which is for expressing tabular data expressed as

~~an array of records each including an item and an item value belonging to the item and in which item values are stored in order of item value numbers corresponding to the item values belonging to a specific item, and a pointer array in which pointer values to indicate the item value numbers are stored in a unique order of an ordered set array, and a global information block is formed of an aggregate of the information blocks held in the respective memories, and~~

~~the information processing method is characterized by comprising:~~

- ~~i. in each of the memory module, an offset value storage step of holding an offset value to indicate which position the that its own grasped information block held by this memory module occupies in the global information block, as a subset of the global information block, occupies which position in the pointer array;~~
- ~~ii. a global ordered set array creation step of creating a global ordered set array containing global sequence numbers corresponding to the records in the global information block based on the offset value;~~
- ~~iii. packetizing the a packet transmission step of packeting its own value list for each of an item held by this memory module and transmitting the value list to one adjacent first memory module it by using the transmission path between the adjacent memory modules;~~
- ~~iv. a packet reception step of receiving packetized a packeted value lists held by an other adjacent second list of another memory module by using the transmission path in parallel to the packet transmission; and~~
- ~~v. an order judgment step comprising (1) comparing the value list held by this memory module with each of the received value lists, (2) deleting a duplicate item value from each of the received value lists when there is a duplicate value between the value list held by this memory module and each of the received value lists, (3) determining a relative sequence number of the item value in the value list held by this memory module in relation to the~~

received value lists, (4) determining a global sequence number of the item value in the value list held by this memory module across the global information block based on the relative sequence number, and (5) storing the determined global sequence number of the item value in the global information block into a global value number array for each item of referring to the received respective value list and storing an order, in the global information block of the item value, of the item value in its own value list of the item into a global value number array relating to the item.

38. (Currently Amended) The information processing method according to claim 37, wherein characterized in that the order judgment step further includes (6) specifying a value in the global ordered set array in accordance with an instruction to specify a sequence number of the record and extracting the record indicated by the specified valuea step of calculating the order in the global information block by adding a total sum of differences between the judged respective relative orders and the original order to the original order.

39. (Cancelled)

40. (Currently Amended) The information processing method according to claim 37, wherein characterized by comprising: in each of the memory modules, the method further comprises the steps of:

a flag array setup step of creating a flag array with the same size as the value list for an item to be retrieved of the item and for setting giving a specific value to an element at a position inside of the flag array corresponding to an item value satisfying one incident with a retrieval condition;

~~a retrieval condition judgment step of judging, for the item to be retrieved, whether a record corresponding to a value in the ordered set array satisfiesis coincident with the retrieval condition by specifying, with respect to an item to be retrieved, a value in the pointer array corresponding to a position indicated by the value in the ordered set array and then by specifying a value in the flag array corresponding to a position indicated by the value in the pointer array;~~

~~a local retrieval step of storing thea value in theof an ordered set array satisfyingeoincident with the retrieval condition and a corresponding value in theof a corresponding global ordered set array into a second ordered set array and a second global ordered set array, respectively;~~

~~packetizing and transmittinga second packet transmission step of packeting the second global ordered set array to the one adjacent first memory module throughand transmitting it by using the transmission path;~~

~~a second packet reception step of receiving the packetizeda packeted second global ordered set array from the other adjacent secondef another memory module by using the transmission path in parallel to the second packet transmission; and~~

~~a second order judgment step of determining a sequence numberan order, in the global information block, of thea value in the secondits own global ordered set array held by this memory module across the global information block by referring to the received respective second global ordered set arraysarray and storing the determined sequence number acrossorder in the global information block into a third global ordered set array,~~

~~wherein a sequence numberan order of a record satisfyingeoincident with the retrieval condition is decided by thea value of the third global ordered set array.~~

41. (Currently Amended) The information processing method according to claim 37, wherein, characterized by comprising: in each of the memory modules, the method further comprises the steps of:

counting up values in the logical coordinate array having a size equal to a product of sizes of value lists for items to be tabulated by the number of records held by this memory module for each of sets of item values for the items to be tabulated, the values in the logical coordinate array indicating the number of the sets of global sequence numbers of the item values across the global information block; a count-up step of creating, with respect to items to be tabulated, a logical coordinate array with a size obtained by multiplying sizes of value lists of the items, and acquiring the number of records for each set of item values of each item by counting up values of the logical coordinate array indicated by values in the ordered set array and corresponding to sets of values in the pointer arrays of the items to be tabulated; and

packetizing a third packet transmission step of packetizing and transmitting, by using the transmission path, the logical coordinate array, to which the count-up has been applied by the counting up step, to one adjacent third memory module through the transmission path performed,

wherein each of the memory modules sequentially receives the counted up logical coordinate array from the other adjacent second module and applies the counting up step and the step of packetizing and transmitting the logical coordinate array to the received counted up logical coordinate array until the number of records for each set of item values of each global item is stored in the logical coordinate array by sequentially executing, in each of the memory modules, the count-up step to the same logical coordinate array and the transmission step using the one transmission path, and

there are further included:

- a third packet reception step of, in each of the memory modules, receiving and storing the logical coordinate array in which the count up has been ended; and
- a fourth packet transmission step of transmitting the received logical coordinate array by using the transmission path.

42. (Cancelled)

43. (Currently Amended) The information processing method according to claim 37, wherein characterized by comprising: in each of the memory modules, the method further comprises the steps of:

an existence number array creation step of creating, with respect to an item to be sorted, an existence number array with the same size as that of a value list for an item to be sorted; and for arranging the number of values in the existence number array, the values in the ordered set array specifying to specify respective item values in the value list, of the ordered set array;

an accumulated number array creation step of accumulating the values in the existence number array, calculating an accumulated number to indicate a head position of records a record having a corresponding item value at a time when the sort is performed in the memory module, and arranging the accumulated number in an accumulated number array;

a local sort step of creating a second global value number array, a fourth global ordered set array and a third ordered set array, and arranging a global value number corresponding to the item value in the second global value number array, the value of the ordered set array in the third ordered set array and the value of the corresponding global ordered set array in the fourth global ordered set array at respective positions indicated by the

accumulated number based on the accumulated number in the accumulated number array corresponding to the item value indicated by the value of the ordered set array at a position indicated by the accumulated number in the second global value number array based on the accumulated number in the accumulated number array corresponding to an item value indicated by a value of the ordered set array, and arranging a value of the ordered set array and a value of the corresponding global ordered set array at a position indicated by the accumulated number in the third ordered set array and the fourth global ordered set array;

packetizing a fifth packet transmission step of packeting and transmitting at least the second global value array to the one adjacent first memory module throughby using the transmission path;

a fourth packet reception step of receiving the packetized a paeketed second global value array from the other adjacent secondef another memory module throughby using the transmission path in parallel to step of packetizing and transmitting at least the second global value arraypacket transmission; and

a third order judgment step of storing a sequence numberan order, in the global information block, of a value in theits own second global value number array held by this memory module into athe fifth global ordered set array by referring to the received second global value number arrays, wherein the sequence number of the value is determined in the global information block, and

wherein a sequence numberan order of the sorted record is defineddecided by the value contained inof the fifth global ordered set array.

44. (Cancelled)

45. (Currently Amended) A program maintained in a memory offor an information processing system, wherein the information processing system includes including

(a) a plurality ofplural information processing units arranged in a ring shape, each unit holding a local information block to representexpress tabular data expressed as an array of records including an item and item values belonging to respective items;the item, and

(b) a packet transmission path to connect the plurality ofplural information processing units,

wherein the local information block includes a value list havingin which the item values are stored in order of item value numbers indicating positions of thecorresponding to item values in the value listbelonging to a specific item, and a pointer array in which pointer values to indicate the item value numbers are stored in order of unique local sequence numbers to indicate a unique local order corresponding to the records, and

the program causes each of the information processing units to execute the steps ofrealize:

a function of creating, based on the local sequence numbers to indicate the local order in the local information block, unique global sequence numbers to indicate a unique global order in all of the plurality ofthe plural information processing units;

a function of transmitting the value list to one adjacent firstanother information processing unit through the packet transmission path;

a function of receiving thea value list from an other adjacent secondthe another information processing unit through the packet transmission path; and

deleting a duplicative item value ina function of giving, by referring to an item valuesvalue in the value list from the other adjacent secondanother information processing unit when there is a duplicate value between the value lists transmitted from this processing unit and received from the other adjacent second information processing unit, and giving a

global sequence number across order in all of the plurality of plural information processing units to the item value in the value list in the local information block.

46. (Currently Amended) An information processing system comprising:

a plurality of plural information processing units arranged in a ring shape, each unit including a memory and a control device,

wherein the memory of each of the information processing units holds tabular data expressed as an array of records each including an item and an item value belonging to respective items the item, and

global tabular data is formed of an aggregate of the tabular data held by the information processing units respective memory modules, wherein and the information processing system is characterized in that

the global tabular data contains, for each item, unique global sequence numbers of the item values held by all of the information processing units, the unique global sequence numbers are given to the item values by deleting a duplicate item value and

each of the information processing units includes:

a local ordered set array containing values indicating local orders of the respective records in the information processing unit;

i. a global ordered set array containing values indicating sequence numbers orders of the respective records in the global tabular data; and

ii. record extraction means for identifying specifying a value in the global ordered set array in accordance with an instruction to specify a sequence number an order received by the control device of the respective information processing unit, for specifying a value in the local ordered set array, a position of said value in the local ordered set array being consistent

with that of the value in the global ordered set array, and for extracting the record indicated by the identified value in n the global local ordered set array.

47. (Currently Amended) The information processing system according to claim 46,  
wherein characterized in that the information processing unit holds a further ordered set array  
in which the values identifying the records are permuted is adopted such that,  
——— in order to reflect a sort order in the respective information processing unit, and  
rearranges the values indicating the sequence numbers in the global ordered set array in order  
to reflect a sort order of the record in the global tabular data, wherein the record is specified  
by the value in the further ordered array in case that the values in the local ordered set array  
are exchanged,  
——— in the global ordered set array, the value indicating the order is rearranged to indicate  
a sort order, in the global tabular data, of the record indicated by the value in the another  
ordered set array.

48. (Currently Amended) The information processing system according to claim 46,  
wherein characterized in that the information processing unit rearranges the values value  
indicating the sequence numbers order to indicate the sort order, in the global ordered set  
array, in order to reflect a sort order of the record in the global tabular data, wherein the  
record is sorted in the respective information processing unit.

49. (Currently Amended) The information processing system according to claim 46,  
wherein theecharacterized in that a memory of each of the information processing units holds  
——— an information block arranged to represent tabular data expressed as an array of  
records including item values belonging to respective items, the information block including

a value list having the item values stored in order of item value numbers indicating positions of the item values in the value list which is for expressing tabular data expressed as an array of records each including an item and an item value belonging to the item and in which the item values are stored in order of item value numbers corresponding to item values belonging to a specific item, and a pointer array in which pointer values to indicate the item value numbers are stored in order of a unique local sequence numbers corresponding to the records of an ordered set array, and

a global information block is formed of an aggregate of the information blocks held by in the respective memories.

50. (Currently Amended) An information processing system comprising a plurality of plural information units arranged in a ring shape, each unit including a memory and a control device,

wherein the memory of each of the information processing units holds an information block arranged to represent including a value list which is for expressing tabular data expressed as an array of records each including an item and an item value belonging to respective items, the information block including a value list having the item values stored in order of item value numbers indicating positions of the item values in the value list the item and in which item values are stored in order of item value numbers corresponding to the item values belonging to a specific item, and a pointer array in which pointer values to indicate the item value numbers are stored in a unique order of unique local sequence numbers corresponding to the records of an ordered set array, and a global information block is formed of an aggregate of the information blocks held by in the respective memories, wherein and the information processing system is characterized in that

the information processing unit includes:

a global value number array to contain a value indicating a sequence number~~an order~~  
of the~~a~~ item value in the~~a~~ global information block; and

item value extraction means for identifying~~s~~specifying a value in the global value  
number array in accordance with an instruction to specify sequence number~~an order~~ received  
by the control device of this information processing unit, and for extracting the~~a~~ item value  
in the value list indicated by the identified value in the global value number array.